

What is claimed is:

1. An optical pickup comprising:

a light source that is provided for generating a laser light;

an objective lens that condenses the laser light to form a light spot for irradiating an optical disk formed of a substrate and having a pair of major surfaces spaced from each other by a thickness of the substrate and a recording face interposed between the major surfaces; and

an actuator that is provided for moving the objective lens in a direction of the thickness of the optical disk within a total movable range so as to focus the light spot on either one of the recording face and the major surface, wherein

the total movable range of the objective lens is set to be equal to or more than a sum of an allowance range and an additional range, the allowance range being set to allow the objective lens to keep a constant distance between the objective lens and the recording face even when a level of the optical disk varies in the direction of the thickness, the additional range being set by dividing a gap between the major surface and the recording face of the optical disk by an absolute refraction index of the substrate of the optical disk.

2. The optical pickup according to claim 1, wherein the

actuator can switch the objective lens between a first base point and a second base point within the total movable range, such that the objective lens can selectively move around the first base point within the allowance range to allow the light spot to follow the recording face or move around the second base point within the allowance range to allow the light spot to follow the major surface.

3. The optical pickup according to claim 2, wherein the actuator moves the objective lens such that a first movable range of the objective lens extending from the first base point in an inward direction toward the optical disk is set comparable to a second movable range of the objective lens extending from the second base point in an outward direction opposite to the optical disk.

4. An apparatus for recording information in an optical disk formed of a substrate and having a pair of major surfaces spaced from each other by a thickness of the substrate and a recording face interposed between the major surfaces, the apparatus comprising:

an optical pickup comprising a light source for generating a laser light, an objective lens that condenses the laser light to form a light spot for irradiating the optical disk, and an actuator for moving the objective lens in a direction of the thickness of the optical disk within a total movable range so as to apply the light spot on either

of the recording face and the major surface, the actuator being capable of switching the objective lens between a first base point and a second base point within the total movable range, which is set equal to or more than a sum of an allowance range and an additional range, the allowance range being set to allow the objective lens to keep a constant distance between the objective lens and the recording face even when a level of the optical disk varies in the direction of the thickness, the additional range being set by dividing a gap between the major surface and the recording face of the optical disk by an absolute refraction index of the substrate of the optical disk;

a focusing servo section that can servo-control the actuator to move the objective lens around the first base point within the allowance range to focus the light spot on the recording face, and can servo-control the actuator to move the objective lens around the second base point within the allowance range to focus the light spot on the major surface;

an input section that designates one of the recording face and the major surface as a target of recording information; and

a control section being operative when the recording face is designated for instructing the focusing servo section to focus the light spot on the recording face based on the first base point to thereby record the information in the recording face, and being operative when the major surface is

designated for instructing the focusing servo section to focus the light spot on the major surface based on the second base point to thereby record the information in the major surface.

5. The apparatus according to claim 4, wherein the control section operates when the input section designates one of the major surfaces as a label face of the optical disk for instructing the pickup to record information such a manner as to form an visual image on the label face.

6. A method of recording information by an optical pickup in an optical disk formed of a substrate and having a pair of major surfaces spaced from each other by a thickness of the substrate and a recording face interposed between the major surfaces, the optical pickup having a light source for generating a laser light, an objective lens that condenses the laser light to form a light spot for irradiating the optical disk, and an actuator for moving the objective lens in a direction of the thickness of the optical disk within a total movable range so as to apply the light spot on either one of the recording face and the major surface, the actuator being capable of switching the objective lens between a first base point and a second base point within the total movable range, which is set equal to or more than a sum of an allowance range and an additional range, the allowance range being set to allow the objective lens to keep a constant

distance between the objective lens and the recording face even when a level of the optical disk varies in the direction of the thickness, the additional range being set by dividing a gap between the major surface and the recording face of the optical disk by an absolute refraction index of the substrate of the optical disk, the method comprising the steps of:

designating one of the recording face and the major surface as a target of recording information;

servo-controlling the actuator when the recording face is designated to move the objective lens around the first base point within the allowance range to focus the light spot on the recording face to thereby record the information in the recording face; and

servo-controlling the actuator when the major surface is designated to move the objective lens around the second base point within the allowance range to focus the light spot on the major surface to thereby record the information in the major surface.

7. A program for use in an optical recording apparatus having a processor and an optical pickup for recording information in an optical disk formed of a substrate and having a pair of major surfaces spaced from each other by a thickness of the substrate and a recording face interposed between the major surfaces, the optical pickup having a light source for generating a laser light, an objective lens that condenses the laser light to form a light spot for irradiating the

optical disk, and an actuator for moving the objective lens in a direction of the thickness of the optical disk within a total movable range so as to apply the light spot on either one of the recording face and the major surface, the actuator being capable of switching the objective lens between a first base point and a second base point within the total movable range, which is set equal to or more than a sum of an allowance range and an additional range, the allowance range being set to allow the objective lens to keep a constant distance between the objective lens and the recording face even when a level of the optical disk varies in the direction of the thickness, the additional range being set by dividing a gap between the major surface and the recording face of the optical disk by an absolute refraction index of the substrate of the optical disk, the program being executable by the processor for causing the optical recording apparatus to perform a method comprising the steps of:

designating one of the recording face and the major surface as a target of recording information;

servo-controlling the actuator when the recording face is designated to move the objective lens around the first base point within the allowance range to focus the light spot on the recording face to thereby record the information in the recording face; and

servo-controlling the actuator when the major surface is designated to move the objective lens around the second base point within the allowance range to focus the light spot

on the major surface to thereby record the information in the major surface.